Remarks

The present application includes claims 1-20. Claims 1, 10, and 16 have been amended. Paragraphs [28], [37], [38], and [40] have been amended.

The drawings were objected to as failing to comply with 37 C.F.R. 1.84(p)(5) for including reference sign(s) not mentioned in the description. Specifically, the Office Action stated that item 90 in Figure 3 and item 112 in Figure 5 were not mentioned in the description.

The Applicant has amended paragraph [28] to include a reference to item 90. The Applicant respectfully points out that references to item 112 exist in paragraph 40 of the specification. While a reference to item 112 exists in the specification, a reference to item 114 was missing from the specification and the Applicant believes this may have been the intended objectionable item. The Applicant has amended paragraph 40 to include a reference to item 114.

The Applicant has also amended paragraphs [37] and [38] to correct typos. A reference to step 102 in paragraph [37] has been amended to reference step 104. Similarly, a reference to step 104 in paragraph [38] has been amended to reference step 102 and a reference to step 106 has been amended to reference step 104. Paragraph [40] has also been amended to reference step 102 rather than step 104.

Claims 1-3 and 5-20 were rejected under 35 U.S.C. § 103(a) as being obvious over Kump et al. (U.S. Pat. Pub. No. 2003/0169850) in view of McDaniel et al. (U.S Pat.

No. 4,996,413) and Granfors et al. (U.S. Pat. No. 5,452,338).

With regard to independent claims 1 and 16:

Kump presents a method for minimizing artifacts in dual or multiple energy images. According to Figure 4 of Kump, a detector is exposed to a first dosage of x-rays (step 404) and a first image is obtained (step 406). Then, the detector is exposed to a second dosage of x-rays (step 410) and a second image is obtained (step 412). After both the first image and second image have been obtained, a first offset image and second offset image are obtained (steps 416, 418). The first offset image and second offset image are subtracted from the first image and second image, respectively (see paragraphs [0039] and [0040]).

If more images are to be obtained, the process is repeated. Each time that images are obtained, a first image and a second image are obtained. After both the first image and second image are obtained, a new first offset image and a new second offset image are obtained and applied to the first image and second image, respectively (see Figure 4 and paragraph [0045]. Thus, the method of Kump acquires and applies the first offset image and second offset image after both the first image and second image have been acquired and stored.

Kump does not apply offset image data to incoming image data. Rather, Kump first acquires image data and stores the image data, next Kump acquires offset image data, lastly Kump applies the offset image data to the stored image data.

Furthermore, Kump does not apply offset image data to incoming image data depending upon the current mode of operation. Kump presents a method where the first

offset image and second offset image are always acquired and applied after the second image is obtained. Kump does not determine the current mode of operation. For example, Kump does not determine if the system is acquiring an image in a first mode of operation or if the system is acquiring an image in a second mode of operation. Because Kump does not determine the current mode of operation, Kump does not select and apply one of said first offset image or said second offset image to incoming image data depending upon the current mode of operation.

Consequently, Kump does not disclose or suggest the limitation in amended independent claims 1 and 16 of an image processor applying the contents of one of said first offset image memory or said second offset image memory to incoming image data depending upon the current mode of operation.

McDaniel presents a system for reading data from an image detector. The system of McDaniel proposes ways of reducing data processing time. One way in which the system of McDaniel reduces data processing time is to divide the array of detector elements into groups (col. 4, lines 49-52). Rather than read data from the detector elements one row at a time, McDaniel proposes reading a row of data from each of the groups simultaneously (col. 4, lines 57-60). By reading data from more than one row at a time, the amount of time to read all of the rows of data is reduced. Thus, McDaniel discloses reducing the time required to process image data by reading more than one row of data at a time.

Another way in which McDaniel proposes to reduce data processing time is to combine data from various detector elements (col. 5, lines 3-8). For example, charge

signals from adjacent detector elements can be combined along a column or row (col. 5, lines 38-66). By combining charge signals from adjacent detector elements, the amount of data to be processed is reduced. Thus, McDaniel discloses a system for reducing the amount of image data to be processed by combining charge signals from adjacent detector elements.

McDaniel does not disclose or suggest applying offset image data to incoming image data. McDaniel discusses the problem of offset in an image signal (col. 1, lines 54-66). McDaniel then presents a solution to the problem of offset that involves reducing the amount of time required to read out the elements of the detector array. McDaniel does not discuss applying offset image data nor does McDaniel discuss offset image memories.

Consequently, McDaniel does not disclose or suggest the limitation in amended independent claims 1 and 16 of an image processor applying the contents of one of said first offset image memory or said second offset image memory to incoming image data depending upon the current mode of operation.

Granfors presents a system for real time offset correction. As illustrated in Figure 1, incoming images 12 are received from a detector. If the detector was not exposed to x-rays (a dark image), the incoming image 12 is combined with the contents of a stored offset image memory 14 and that memory is updated (col. 2, lines 63-65). If the detector was exposed to x-rays, the offset image stored in the offset image memory 14 is subtracted from the incoming image 12 in order to compensate for image offset. Thus,

Granfors discloses updating an offset image that is stored in an offset image memory and then subtracting the offset image from an incoming image.

Granfors does not disclose or suggest a first offset image memory and a second offset image memory. Likewise, Granfors does not disclose or suggest choosing between a first offset image memory or a second offset image memory and applying the contents of a chosen offset image memory to an incoming image. Granfors presents a system with a single offset image memory.

Consequently, Granfors does not disclose or suggest the limitation in amended independent claims 1 and 16 of an image processor applying the contents of one of said first offset image memory or said second offset image memory to incoming image data depending upon the current mode of operation.

With regard to independent claim 10:

Kump presents a method for minimizing artifacts in dual or multiple energy images. According to Figure 4 of Kump, a detector is exposed to a first dosage of x-rays (step 404) and a first image is obtained (step 406). Then, the detector is exposed to a second dosage of x-rays (step 410) and a second image is obtained (step 412). After both the first image and second image have been obtained, a first offset image and second offset image are obtained (steps 416, 418). The first offset image and second offset image are subtracted from the first image and second image, respectively (see paragraphs [0039] and [0040]).

If more images are to be obtained, the process is repeated. Each time that images are obtained, a first image and a second image are obtained. After both the first image and second image are obtained, a new first offset image and a new second offset image are obtained and applied to the first image and second image, respectively (see Figure 4 and paragraph [0045]. Thus, the method of Kump acquires and applies the first offset image and second offset image after both the first image and second image have been acquired and stored.

Kump does not select an offset image from a plurality of stored offset images. Kump acquires new offset images after each time new images are acquired. Furthermore, Kump does not utilize the selected offset image to process more than one image. Kump acquires and applies a first offset image to a first image and Kump acquires and applies a second offset image to a second image.

Consequently, Kump does not disclose or suggest the limitations in amended independent claim 10 of selecting a first offset image corresponding to said first mode of operation from a plurality of stored offset images. Nor does Kump discloses or suggest the limitation in amended independent claim 10 of utilizing said first offset image to process a first image and a second image.

As discussed above with regards to claims 1 and 16, McDaniel presents a system for reading data from an image detector. The system of McDaniel proposes ways of reducing data processing time. One way McDaniel suggests for reducing processing time is to read data from more than one row of the array of detector elements simultaneously.

Another way McDaniel suggests for reducing processing time is combining charge signals from adjacent detector elements.

McDaniel does not disclose or suggest applying offset image data to incoming image data. McDaniel discusses the problem of offset in an image signal (col. 1, lines 54-66). McDaniel then presents a solution to the problem of offset that involves reducing the amount of time required to read out the elements of the detector array. McDaniel does not discuss applying offset image data nor does McDaniel discuss offset image memories.

Consequently, McDaniel does not disclose or suggest the limitation in amended independent claim 10 of selecting a first offset image corresponding to said first mode of operation from a plurality of stored offset images. Nor does McDaniel discloses or suggest the limitation in amended independent claim 10 of utilizing said first offset image to process a first image and a second image.

Granfors presents a system for real time offset correction. As illustrated in Figure 1, incoming images 12 are received from a detector. If the detector was not exposed to x-rays (a dark image), the incoming image 12 is combined with the contents of a stored offset image memory 14 and that memory is updated (col. 2, lines 63-65). If the detector was exposed to x-rays, the offset image stored in the offset image memory 14 is subtracted from the incoming image 12 in order to compensate for image offset. Thus, Granfors discloses updating an offset image that is stored in an offset image memory and then subtracting the offset image from an incoming image.

Granfors does not disclose or suggest selecting an offset image from a plurality of stored offset images. Granfors includes a single offset image memory that stores a single offset image. Nor does Granfors discloses or suggest using the offset image selected from a plurality of offset images to process a first image and a second image.

Consequently, Granfors does not disclose or suggest the limitation in amended independent claim 10 of selecting a first offset image corresponding to said first mode of operation from a plurality of stored offset images. Nor does Granfors discloses or suggest the limitation in amended independent claim 10 of utilizing the first offset image that was selected from a plurality of stored offset images to process a first image and a second image.

As presented, none of Kump, McDaniel, or Granfors, alone or in combination, teaches all of the limitations of amended independent claims 1, 10, and 16. Thus, the Applicant respectfully submits that amended independent claims 1, 10, and 16, and their respective dependent claims 2-9, 11-15, and 17-20, are not rendered obvious by Kump, McDaniel, or Granfors and therefore should be allowable..

Claim 4 was rejected under 35 U.S.C. § 103(a) as being obvious over Kump et al. in view of McDaniel et al. and Granfors et al., and further in view of Ivan et al. (U.S. Pat. No. 5,877,501).

Claim 4 depends from amended independent claim 1. As presented above, amended independent claim 1 should be in condition for allowance; thus, rendering the rejection of claim 4 moot.

Conclusion

For the reasons discussed above, the Applicant respectfully submits that claims 1-20 should be in condition for allowance.

The Applicant looks forward to working with the Examiner to resolve any remaining issues in the application.

If the Examiner has any questions or the Applicant can be of any assistance, the Examiner is invited and encouraged to contact the Applicant at the number below.

The Commissioner is authorized to charge any necessary fees or credit any overpayment to the deposit account of GTC, account number 070845.

Respectfully submitted,

Dated: December 19, 2003

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